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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/619,633	07/14/2003	Steven Robert Hetzler	ARC9-2003-0016-US1	9167
55508 7590 01/04/2007 JOSEPH P. CURTIN, L.L.C. 1469 N.W. MORGAN LANE PORTLAND, OR 97229-5291			EXAMINER JEAN GILLES, JUDE	
			ART UNIT 2143	PAPER NUMBER
SHORTENED STATUTORY PERIOD OF RESPONSE 3 MONTHS			MAIL DATE 01/04/2007	DELIVERY MODE PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

If NO period for reply is specified above, the maximum statutory period will apply and will expire 6 MONTHS from the mailing date of this communication.

Office Action Summary

Application No.

10/619,633

Applicant(s)

HETZLER ET AL.

Examiner

Jude J. Jean-Gilles

Art Unit

2143

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 14 July 2003.
- 2a) ☐ This action is FINAL. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-26 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-26 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 14 July 2003 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
- ☐ Certified copies of the priority documents have been received.
 - ☐ Certified copies of the priority documents have been received in Application No. _____.
 - ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|---|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08)
Paper No(s)/Mail Date <u>07/14/2003</u> . | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

This office action is responsive to communication filed on 07/14/2003.

Information Disclosure Statement

1. The references listed on the Information Disclosure Statement submitted on 07/14/2003 have been considered by the examiner (see attached PTO-1449A).

Claim Rejections - 35 USC § 102

2. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless -

(e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

3. **Claims 1-26** are rejected under 35 U.S.C. 102(e) as being anticipated by Talagala et al (Talagala), Patent No. 7,017,107 B2.

Regarding **claim 1**, Talagala discloses a pathway determination system for a data storage system having N storage devices and more than N pathways for retrieving requested data from the data storage system (fig. 2A; fig. 2B), the pathway determination system comprising:

a sorter receiving a read request and separating the read request into an appropriate segment size for sending to the storage devices of the data storage system (column 10, lines 48-65; *note that the scrubbing operation here is similar to a read*

Art Unit: 2143

request in which the array controller, in the case of the invention, the sorter, calculate the checksum for every unit of data refers to a segment of data size...);

an assigner selecting a read permutation satisfying the received read request, the selected read permutation being based on a predetermined metric, and the assigner sending the selected read permutation to the storage devices of the storage system (column 10, lines 48-67; column 11, lines 1-8; *it is important to acknowledge the teaching of the pre-calculated checksum which in the case of the invention is the predetermined metric which is based on the read permutation or the reconstructed data checksum*); and

a collector receiving the requested data from the N storage devices in response to the selected read permutation being sent to the storage devices (column 4, lines 1-10; *the disk controller plays the role of the collector, "receiving the read data from within a data range from at least one of the disk drives"*).

Regarding **claim 2**, Talagala discloses the system according to claim 1, wherein the assigner further generates the read permutations satisfying the received read request (column 10, lines 48-67; column 11, lines 1-8).

Regarding **claim 3**, Talagala discloses the system according to claim 2, wherein the read permutations are generated before the read request is received (column 10, lines 48-67; column 11, lines 1-8).

Art Unit: 2143

Regarding **claim 4**, Talagala discloses the system according to claim 1, wherein the assigner includes: a permutation generator generating the read permutations (column 10, lines 48-67; column 11, lines 1-8); and a cost calculator calculating an expense of each permutation based on the predetermined metric (figs. 7A-B, and 8; column 14, lines 29-50).

Regarding **claim 5**, Talagala discloses the system according to claim 4, wherein the cost calculator utilizes queue length information and estimated current cost information, and wherein the permutation generator generates a reduced number of read permutations based on the queue length information and the estimated current cost information (figs. 7A-B, and 8; column 14, lines 29-64).

Regarding **claim 6**, Talagala discloses the system according to claim 5, wherein the cost calculator calculates the expense of each permutation further based on performance information received from the storage devices of the storage system (column 14, lines 29-64).

Regarding **claim 7**, Talagala discloses the system according to claim 1, wherein the storage system includes at least one failed storage device (column 9, lines 57-67; column 10, lines 1-13).

Regarding **claim 8**, Talagala discloses the system according to claim 1, wherein

the metric is dynamically changed based on a change in operating conditions of the storage system (column 9, lines 31-56).

Regarding **claim 9**, Talagala discloses the system according to claim 8, wherein the metric is periodically changed based on operating conditions of the storage system (column 9, lines 31-56).

Regarding **claim 10**, Talagala discloses the system according to claim 1, wherein the metric is based on a current workload balance for the storage devices of the data system (column 14, lines 29-64).

Regarding **claim 11**, Talagala discloses the system according to claim 1, wherein the metric is based on an estimated delay before the requested data can be retrieved from the storage devices of the storage system (column 10, lines 25-41).

Regarding **claim 12**, Talagala discloses the system according to claim 1, wherein the metric is based on a number of outstanding requests in the queue of a storage device of the storage system (column 14, lines 29-64).

Regarding **claim 13**, Talagala discloses the system according to claim 1, wherein the metric is based on a total queue for all outstanding requests that have been received by the storage system (column 14, lines 29-64).

Regarding **claim 14**, Talagala discloses a method for determining a pathway for obtaining data stored in a data storage system having N storage devices and more than N pathways for retrieving requested data from the data storage system, the method comprising steps of:

- receiving a read request from a requester (column 10, lines 48-65);
- separating the read request into an appropriate segment and size for sending the storage devices of the data storage system (column 10, lines 48-65; *note that the scrubbing operation here is similar to a read request in which the array controller, in the case of the invention, the sorter, calculate the checksum for every unit of data refers to a segment of data size...*);
- selecting a read permutation from possible read permutations satisfying the received read request; sending the selected read permutation to the storage devices of the storage system column 10, lines 48-67; column 11, lines 1-8); receiving the requested data from the N storage devices in response to the selected read permutation being sent to the storage devices; and returning the satisfied read request to the requester (column 4, lines 1-10).

Regarding **claim 15**, Talagala discloses the method according to claim 14, further comprising a step of generating the read permutations satisfying the received read request (column 10, lines 48-67; column 11, lines 1-8).

Regarding **claim 16**, Talagala discloses the method according to claim 15, wherein the step of generating the read permutations is performed before the read request is received (column 10, lines 48-67; column 11, lines 1-8).

Regarding **claim 17**, Talagala discloses the method according to claim 15, further comprising a step of calculating an expense of each permutation based on the predetermined metric (figs. 7A-B, and 8; column 14, lines 29-50).

Regarding **claim 18**, Talagala discloses the method according to claim 17, further comprising steps of: generating queue length information and estimated current cost information, and generating a reduced number of read permutations based on the queue length information and the estimated current cost information (figs. 7A-B, and 8; column 14, lines 29-50).

Regarding **claim 19**, Talagala discloses the method according to claim 18, wherein the step of calculating the expense of each permutation is further based on performance information received from the storage devices of the storage system (column 14, lines 29-64).

Regarding **claim 20**, Talagala discloses the method according to claim 14, wherein the storage system includes at least one failed storage device (column 9, lines 57-67; column 10, lines 1-13).

Regarding **claim 21**, Talagala discloses the method according to claim 14, further comprising a step of dynamically changing the metric based on a change in operating conditions of the storage system (column 9, lines 31-56).

Regarding **claim 22**, Talagala discloses the method according to claim 14, further comprising a step of periodically changing the metric based on operating conditions of the storage system (column 9, lines 31-56).

Regarding **claim 23**, Talagala discloses the method according to claim 14, wherein the metric is based on a current workload balance for the storage devices of the data system (column 2, lines 4-26).

Regarding **claim 24**, Talagala discloses the method according to claim 14, wherein the metric is based on an estimated delay before the requested data can be retrieved from the storage devices of the storage system (column 10, lines 25-41).

Regarding **claim 25**, Talagala discloses the method according to claim 14, wherein the metric is based on a number of outstanding requests in the queue of a storage device of the storage system (column 14, lines 29-64).

Regarding **claim 26**, Talagala discloses the method according to claim 14,

Art Unit: 2143

wherein the metric is based on a total queue for all outstanding requests that have been received by the storage system (column 14, lines 29-64).

Conclusion

4. Any inquiry concerning this communication or earlier communications from examiner should be directed to Jude Jean-Gilles whose telephone number is (571) 272-3914. The examiner can normally be reached on Monday-Thursday and every other Friday from 8:00 AM to 5:30 PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, David Wiley, can be reached on (571) 272-3923. The fax phone number for the organization where this application or proceeding is assigned is (703) 305-3719.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is (703) 305-3900.

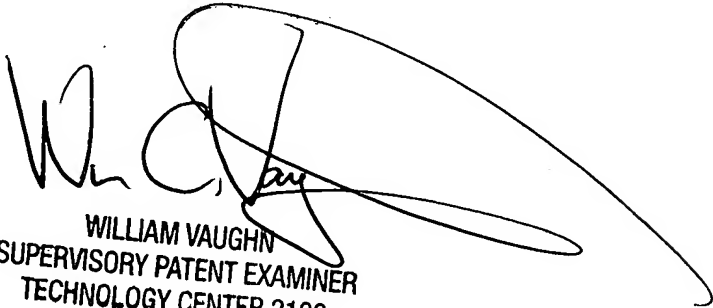
Jude Jean-Gilles

Patent Examiner

Art Unit 2143

JJG

December 25, 2006


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